

I CLAIM:

1. A method of treating coal combustion flue gas containing mercury, comprising: injecting one of molecular halogen and a thermolabile molecular
 5 halogen precursor into said flue gas to effect oxidation of elemental mercury to a mercuric halide and providing one of a liquid and alkaline solid particles in said flue gas in order to adsorb at least a portion of said mercuric halide.

2. The method as claimed in claim 1, wherein said molecular halogen and/or
 10 thermolabile molecular halogen precursor contains one of chlorine, bromine and iodine.

3. The method as claimed in claim 2, wherein said thermolabile molecular
 15 halogen precursor contains a hypohalite.

4. The method as claimed in claim 3, wherein said hypohalite is a
 hypochlorite.

5. The method as claimed in claim 4, wherein said hypochlorite is calcium
 20 hypochlorite.

6. The method as claimed in claim 5, wherein the calcium hypochlorite is in
 aqueous solution.

7. The method as claimed in claim 6, wherein calcium chloride is a
 25 component of the calcium hypochlorite containing solution.

8. A method as claimed in claim 1, wherein the alkaline solid particles are
 30 alkaline coal fly ash particles.

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9. A method as claimed in claim 8, wherein the coal fly ash particles are those derived from combustion of subbituminous or lignite coal.

10. A method as claimed in claim 1, wherein the alkaline solid particles are those derived from the fusion of coal ash with alkali and an alkali flux.

11. A method as claimed in claim 1, wherein the alkaline solid particles are those derived from the decomposition of a thermolabile halogen precursor.

12. A method as claimed in claim 1, wherein the alkaline solid particles are those derived from flue gas desulphurization solids.

13. The method as claimed in claim 1, wherein the resulting treated flue gas containing alkaline solid particles is passed through an electrostatic precipitator.

14. The method as claimed in claim 1, wherein the resulting treated flue gas containing alkaline solid particles is passed through a baghouse.

15. The method as claimed in claim 1, wherein the resulting treated flue gas containing alkaline solid particles is passed through a fabric filter.

16. The method as claimed in claim 1, wherein the resulting treated flue gas is passed through a flue gas desulphurization system (FGD) containing a liquid..

17. The method as claimed in claim 11, wherein the alkaline particles contain lime.

18. The method as claimed in claim 1, wherein the mercuric halide containing alkaline solids is used as a cementitious product.

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